

ABSTRACT OF THE DISCLOSURE

A article that is formed from high carbon steel has a circumferential surface that is hardened for the full circumference of the surface without a softened tempered segment in the surface. To this end, the article is heated until its temperature exceeds the Ms temperature for the high carbon steel, but only by 50° F to 100° F. Then, while the article is maintained above the Ms temperature, a small localized area of the circumferential surface is subjected to a focused heat source which elevates the temperature of the steel at that area of the circumferential surface and immediately behind it above the lower critical temperature for the steel, so that at least some of the steel at the area transforms into austenite. The article rotates relative to the focused heat source, so that the localized area progresses over the entire circumferential surface, thus converting the steel along the entire surface into austenite. Thereafter, the article is quenched, to below the Ms temperature to transform the austenite into martensite or else is maintained at the temperature slightly above the Ms temperature long enough to convert the austenite into bainite. In either event the circumferential surface becomes harder than the remainder of the article.